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Can Gingko and Turmeric Help Stop Ebola?

Summary

There is no known pharmaceutical currently available that specifically treats Ebola disease. An experimental serum used on two American patients may have promise, but has not been approved for use by the FDA and is not widely available.

One treatment modality that should be considered is the use of herbal medicines, which have both centuries old anecdotal success as well as recent modern biochemical and formal research rationales for their use.

Five areas of action that could be addressed by the herbal medicines as it relates to Ebola are:

- VP24/immune system evasion
- GP protein/replication
- herbal strategies effective against similar hemorrhagic disease
- beneficial modulation of patient immune and inflammatory response systems
- prophylactic use for healthcare workers and patients with possible exposures

Selection criteria for recommended herbs included research published in Pubmed-listed journals showing positive outcomes using in-vitro, animal, or human trials – largely in studies investigating effective agents against cancer or Dengue fever, a tropical viral hemorrhagic disease with similar symptomatolgy and pathology as Ebola.

Proposed herbs would include:

- turmeric
- gingko
- ursolic acid
- resveratrol
- quercetin
- eleutherococcus
- ashwagandha
- rhodiola
- St. John's wort
- Chinese skullcap

All selected herbs are widely available in commercial products, have very low toxicity profiles, are inexpensive, and available in pill or capsule form.

See also Can Rife Therapy Help Stop Ebola?
See also Can Acupuncture Help Stop Ebola?

Introduction

The reaction of the international health authorities concerning the recent Ebola outbreak is growing more ominous by the day. World Health Organization Director Dr. Margaret Chan has described it as a possible catastrophe in the making.

The fatality rate in this most recent outbreak of Ebola is said to be 65%. However, new reports are emerging that many deaths are not be recorded. Ebola victims typically die of kidney, liver, and heart failure. Traditional methodsand drugs used by cardiologists, hepatololgists, and nephrologists are of little use.

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In view of this alternative treatment modalities with some rationale for success should be considered . Herbal medicines have both centuries of anecdotal success and more recent biochemical and research support for their potential benefit against Ebola.

Background

Ebola is a negative sense, single-strand RNA virus that must attach to and then enter host cells to replicate.

To date, there is no effective antidote or vaccine for the disease. Care is of a supportive nature and includes administering IV fluids, supplemental oxygen, blood transfusions, and correcting electrolytes.

Even with optimal care, the mortality is around 60% and patients often die a grisly death marked by severe hemorrhaging from the skin, mouth, eyes, and rectum.

A large part of the clinical symptomatology is a result of the overwhelming systemic infection caused by the virus. It has been well-described that as the viral load in the body increases, the normal homeostatic mechanisms break down.

This leads to the supposition that if the viral load can be decreased or held in check and the systemic inflammatory response can be reversed the risks of survival are greatly increased.

Molecular action

To understand Ebola one must understand the molecular structure of the virion and how that affects its virulence. The virion is composed of 7 structural proteins and one non-structural proteins. This genetic sequence is as follows:

3'-leader-NP-VP35-VP40-**GP**/sGP-VP30-**VP2**4-L-trailer-5'

The key proteins that determine its virulence are the VP24 proteins and the GP proteins. Understanding the mechanisms of actions of both may give clues on which herbal medicines may have efficacy in combating the disease.

VP24 and Immune System Evasion

Once the Ebola virus enters a patient's body, one of its first tasks is to avoid the host immune system. Ebola has developed a particularly effective way to disable the interferon response system, the very molecules designed to disable it.

VP24 inhibitsinterferon activity by a complex mechanism. The key molecule disabled is the STAT1, a transcription factor which is also a common target of many other viral infections. The main function of STAT1 is to travel from the cell cytoplasm to the nucleus to give signals to the genes that control immune mechanisms to activate.

In a normal, uninfected cell, STAT1 exists in the unphosphorylated state. In order for it to get to the nucleus, it needs to have a phosphorus atom added by a molecule called Janus-activated kinases (JAK).

Once this is completed molecules called karyopherin proteins shuttle the activated, ready-to- go STAT1 to the nucleus to give the go ahead to effect an immune response.

The VP24 Ebola protein works to sabotage this system by binding the shuttle karyopherin proteins that carry STAT1 into the nucleus. In addition, it is now known that like other viruses, Ebola also directly binds with and disables STAT1.

So STAT1 receives a double whammy from Ebola. No STAT1 traveling to the nucleus equals decreased immune response.

In addition, VP24 also wrecks havoc on the immune system by preventing the phosphorylation of p38 MAP kinase, another beneficial player in the process of activating the immune system.

So, the goal in trying to stop Ebola is to find herbal medicines that increase the amount of STAT1 in the nucleus and increase the amount of phophorylated p38.

One herbal medicine that has been shown in in-vitro studies to increase the immune boosting proteins JAK, STAT1, and p38 is turmeric.

Turmeric

Considered to be one of the “pillars” of the herbal armamentarium, it is the main bioactive ingredient in curry. Used in India for thousands of years, it is known for its protean beneficial health effects and its wide therapeutic window. It is often prescribed to cancer patients in doses of up to 12 grams/day with little or no side effects.

Turmeric is one of most researched herbal medicines. A search on PubMed for the turmeric returned more than 3000 abstracts.

In several studies of cancer cell lines, turmeric was shown to increase phosphorylantion of p38 and increase the levels of the JAK-activated STAT1 in the cell nucleus.

Turmeric powder

Of interest to this discussion is that in addition to the multiple beneficial effects on the immune system and the inflammatory cascade, research and clinical data show that turmeric is active against a large number of viruses. Published research supports its efficacy against the following viruses:

1. HIV
2. Influenza
3. Herpes Simplex-1
4. Herpes Simplex-2
5. Coxsackievirus
6. Hepatitis B
7. Hepatitis C
8. Human papilloma virus
9. Japanese Encephalitis virus
10. HTLV-1

GP protein and Replications

As with all viruses, the Ebola virion is not able to replicate on its own and the genomic

material of Ebola is not infectious in and of itself. It must use the cellular and biochemical machinery of host cells to build the duplicate copies of its genome that eventually cause symptoms to appear.

Thus, if the virus can be blocked from attaching to the cell wall and then entering the cell, the severe sequela of the disease may be avoidable.

So, how does the virus go about attaching and entering host cells and how can this be blocked?

The key protein for the attachment of the virus onto the host cell is the GP subunit. It is now known that the GP subunit must be cleaved to an even smaller molecule called GP1 in order for it to attach to the specific receptor that allows entry into the cell – the Niemann Pick C1 receptor.

And, cleavage of the GP subunit to produce the GP1 molecule is performed by the molecule cathepsin B.

It has been shown from recent work that if this interaction someone does not take place, there is no infectious entry.

So, the two key host factors are cathepsin B and Niemann Pick C1. This understanding leads to the consideration of several possible strategies to block GP, cathepsin B, Niemann Pick C1 interaction.

One strategy would be to block the Niemann Pick C1 receptor with an inhibitor (a “false key”) to prevent the real virus GP1 key from inserting into the Niemann Pick C1 “lock.”

A second strategy would be to eliminate the real key that the virus uses to enter the cell –the GP1 molecule. Since the GP1 molecule is made by cathepsin B when it cleaves the GP structural protein, if cathepsin B was blocked, it would not be able to produce the GP1 key for that would allow the virus to enter the cell and replicate.

Strategy 1 – Inhibiting the Niemann Pick C1 receptor

There are no described, readily available herbal medicines that have been determined to do this. While a discussion of manufactured pharmaceuticals is outside of the scope of this paper, there is an increasing body of literature (mostly from cancer studies) investigating the use of synthetic small molecule inhibitors to block Neimann Pick C1 receptor.

One recent study published in the prestigious journal Nature undertook a search for small molecules and identified a novel molecule benzylpiperazine adamantine diamide (dubbed 3.0) that blocked the receptor.

Strategy 2 – Inihiting Cathepsin B

Cathepsin B is one of family of molecules known as cysteine proteases. They are naturally occurring in the body and are needed in small amounts for normal physiological function.

However, they are also known to play a regulatory role in many pathological processes including cancer, arthritis, pancreatitis, thromboembolic disordes, as well as viral disorders.

Because of their role in the development and progression of cancer, there has been much recent investigation into developing inhibitors that will reduce their expression. The pharmaceutical industry has invested huge resources in developing synthetic inhibitors to be used as chemotherapeutic agents.

In addition, there has been recent interest in “finding” natural substances in the plant and animal world that can be isolated and used to down regulate expression of cathepsin B.

Since cathepsin B does have some positive role in the body’s function, an optimal inhibitor

would cause only a temporary, reversible inhibition of cathepsin B.

It is known from the development of synthetic chemotherapy drugs that the use of low molecular weight inhibitors might be of particular use in downregulating cathepsin B.

Researchers then set out on a hunt to find natural substances to find similar herbs and substances that would do likewise. The following is a list of those.

Ursolic acid

This substance is found in many plants including rosemary, sage, and apples. It is readily available as an inexpensive, commercially prepared supplement.

One study testing the properties of the beta form of ursolic acid in a mouse model showed strong inhibition of cathepsin B in micromolar range (IC50=10 microM).

Amentoflavones

These biflavones are found in Gingko biloba and St. John's wort (*Hypericum perforatum*). There have been 5 different amentoflavones studied to date.

One study looked at in vitro studies measuring inhibition of cathepsin B. All five amentoflavones (AMF) were shown to potently inhibit cathepsin B and most importantly, in a reversible fashion. AMF4 was shown to have extreme inhibition with an IC50=of 0.62 microM.

A second study looked at the inhibitory properties of AMF1, AMF2, and AMF3 isolated from Taxodium mucronatum (Montezuma's Cypress) and found similarly strong, reversible inhibition of cathepsin B.

Both Gingko biloba and St. John's wort are inexpensive and widely available in commercially prepared products. Montezuma's Cypress can be located on the internet from herb supply stores that sell bulk herbs.

Resveratrol

This compound has been extensively studied for its anti-cancer and vascular health effects. It is found in numerous plant sources. It is a component of the popular herb Japanese Knotwood, which is sold frequently to the Lyme disease patient community as an anti-Borrelia agent.

Less well-known are the antiviral properties of resveratrol, which occur, in part, through its ability to inhibit cathepsin B.

One study investigating its use against lymphoma cells showed that it significantly lowered cellular levels of cathepsin B.

Resveratrol is widely available as a commercial, inexpensive, and has a very low toxicity profile.

Herbal anti-virals effective against similar virus illnesses

The mos similar viral diseases to Ebola are caused by other virus organisms in the Filoviridae family such as Marburg and Lhassa viruses. However, due to the rare occurrence of clinical cases, published research on the use of herbal medicines to treat these diseases is virtually non-existent.

One possible viral disease that might be helpful in devising plant-based remedies for Ebola is Dengue fever.

Like Ebola, Dengue virus is a single-stranded RNA virus. It causes a similar clinical symptom constellation as Ebola, including presenting fever, headache, myalgias, malaise, vomiting,

diarrhea, and life-threatening hemorrhage. Like Ebola, a large part of the clinical symptom is a result of the production of overwhelming pro-inflammatory cytokines.

Also like Ebola, there is no vaccine or antidote. Treatment consists of supportive care of fluid replacement, cardiovascular support, and electrolyte replacement.

Intriguingly, as in Ebola, the role of upregulated cathepsin B appears to play a role in Dengue fever pathology and inhibition of this improved cell-life in a liver cell study.

Several herbal medicines have been shown to be helpful in treating Dengue infection. These include:

Baicalein

This substance is one of the main components in Chinese skullcap, a widely available commercial product.

There are multiple recent reports on the potent viricial properties of baicalein against both the intracellular and extracellular viral organisms.

At this time, the exact mechanism of this action has not been described. It is also interesting to note that baicalein has been shown to have anti-HIV replication properties also.

Quercetin

Has been shown to have potent effects against the Dengue virus symptomatology. It it known to downregulate the inflammatory response by inhibiting the cytokine cascade and inflammatory molecules such as TNT-alpha, NF-kappaB, IL-1beta, and iNOS

Strenthening/Modulating the Immune System and Shutting Down Inflammation

Ebola patients rapidly become debilitated and suffer failure of various organ systems due to an overwhelming systemic inflammatory response syndrome and adrenal failure. There are multiple herbal medicines that work toward dampening inflammation and restoring homeostasis.

Eleutherococcus

This herb has been used for thousands of years in China and is now widely used in the West with multiple research studies using human subjects.

The plant is considered highly adaptogenic and has beneficial effects on almost every body system of the body.

It has pronounced effects on the hypothalamus/pituitary/adrenal system and assist he body in adjusting to external and internal stressors, resulting in an increased ability of the body to respond to physiological stressors.

Eleutherococcus also has powerful effects on the spleen and monocyte production and action. The herb also increases dendritic cells, critically important cells that interact with external pathogens.

There are multiple clinical trials in humans that show it gives an increased ability to withstand stress and has been shown to move the system toward an anabolic, healing phase.

It has also been shown to have anti-oxidant, anti-inflammatory, and neuroprotective properties.

It is widely available in commercial preparations, has a low toxicity profile, and is inexpensive.

Ashwangandha

Ashwagandha is one of the main medicinal plants in Ayurvedic medicine and has been used for over 3000 years. The herb is considered an adrenal adaptogen and will work to reduce physiological stress.

One published report showed that it significantly reduced stress levels in humans in a double-blinded, randomized, placebo controlled study.

Of particular interest for consideration of use in Ebola, another study showed that it had marked increase in hemoglobin, packed cell volume, and mean corpuscular volume in children.

In addition, it is a wide range of other actions including anti-inflammatory anti-oxidant, anti-fatigue, neural protection, antibacterial, and antifungal.

There are several dozen animal studies showing on the immune mediation properties.

It is widely available in commercial preparations, is inexpensive, and has a very low toxicity profile.

Rhodiola

The chief indication for this herb is its ability to aid in chronic, long-term debilitation from infections and other illnesses. It is known to facilitate recovery from fatigue, brain fog, depression, and low immune function. It is considered to be neuroprotective and neuroregenerative.

It is widely available in commercial preparations, inexpensive, and has a very low toxicity profile.

Prophylactic Use for Healthcare workers and possible exposures.

Like all other infectious disease, both prevention and arresting the pathological process early are highly desirable.

Since the herbs listed above all have very low toxicity profiles, consideration can be given to using some or all of the herbs in a prophylactic manner.

This includes health workers caring for patients and patients possibly exposed and being monitored for symptoms.

In addition, consideration should be given to administering the adaptogenic herbs of ashwangandha, rhodiola, turmeric, and eleutherococcus to blunt the general physical exhaustion and stress of caring for these severely ill patients.

Practical Considerations in Use of Herbal Medicines in Ebola

So, how would one go about setting up a program for use of herbal medicines in Ebola treatment.

Purchase could be easily accomplished by buying all the readily available herbs via the internet with a credit card.

The herbs which all come packaged in tamper-proof plastic bottles could then be shipped via standard commercial shipping.
Storage requirements are shelf-storage only.

Initiation of the herb treatment could be done in a sequential fashion over 2-3 days to monitor effect.

Patient can take the pills by mouth with a sip of water. If they are not able to fluids by mouth the pills and capsules contents can be dissolved in tube feeds or water and placed down

nasogastric tubes.

Since all of the listed herbal medicines above are used in cancer treatment protocols, “super” dosing can be based on the amounts considered effective for chemotherapy-based effects, with a “ramp up” over several days to maximum dose to watch for clinical effects.

Written by Editor

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